

Missouri Department of Natural Resources

## Total Maximum Daily Load Information Sheet

### Muddy Creek and Brushy Creek

---

#### Waterbody Segment at a Glance:

|                              |   |
|------------------------------|---|
| <b>County:</b>               | Pettis  |
| <b>Nearby Cities:</b>        | Sedalia                                       |
| <b>Length of impairment:</b> |   |
| Muddy Creek                  | 1 mile  |
| Brushy Creek                 | 3 mile  |
| <b>Pollutants:</b>           |   |
| Muddy Creek                  | Biochemical Oxygen Demand (BOD)               |
| Brushy Creek                 | BOD, Ammonia, Volatile Suspended Solids (VSS) |
| <b>Source:</b>               | Sedalia Central Wastewater Treatment Plant    |



State map showing location of watershed

**Proposed for deletion on the 2002 303(d) with corrections to the listing: Length of Brushy Creek corrected from 1 mile to 3 miles and Muddy Creek from 33 miles to 1 mile. Pollutant for Brushy Creek changed from NFR (Non-Filterable Residue) to VSS (will not be changed in the approved TMDL).**

**TMDL Priority Ranking:** Low

---

#### Description of the Problem

##### Beneficial uses of Muddy and Brushy creeks

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life and Human Health associated with Fish Consumption

##### Use that is impaired

- Protection of Warm Water Aquatic Life

##### Standards that apply

- The Missouri Water Quality Standard, found in 10 CSR 20-7.031 Table A, for dissolved oxygen (related to Biochemical Oxygen Demand, or BOD) in streams is 5.0 mg/L (milligrams per liter or parts per million).
- Ammonia (NH<sub>3</sub>-N) standards vary depending on the pH and the temperature. Ammonia limits for a Limited Warm Water Fishery (at a pH of 7.8) are 2.0 mg/L for summer and 3.3 mg/L during the winter. The ammonia tables are found at 10 CSR 20-7.031 Table B.
- Standards for volatile suspended solids (VSS) may be found in the general criteria section of the Water Quality Standards, 10 CSR 20-7.031(3)(A) and (C) where it states:

- Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
- Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.

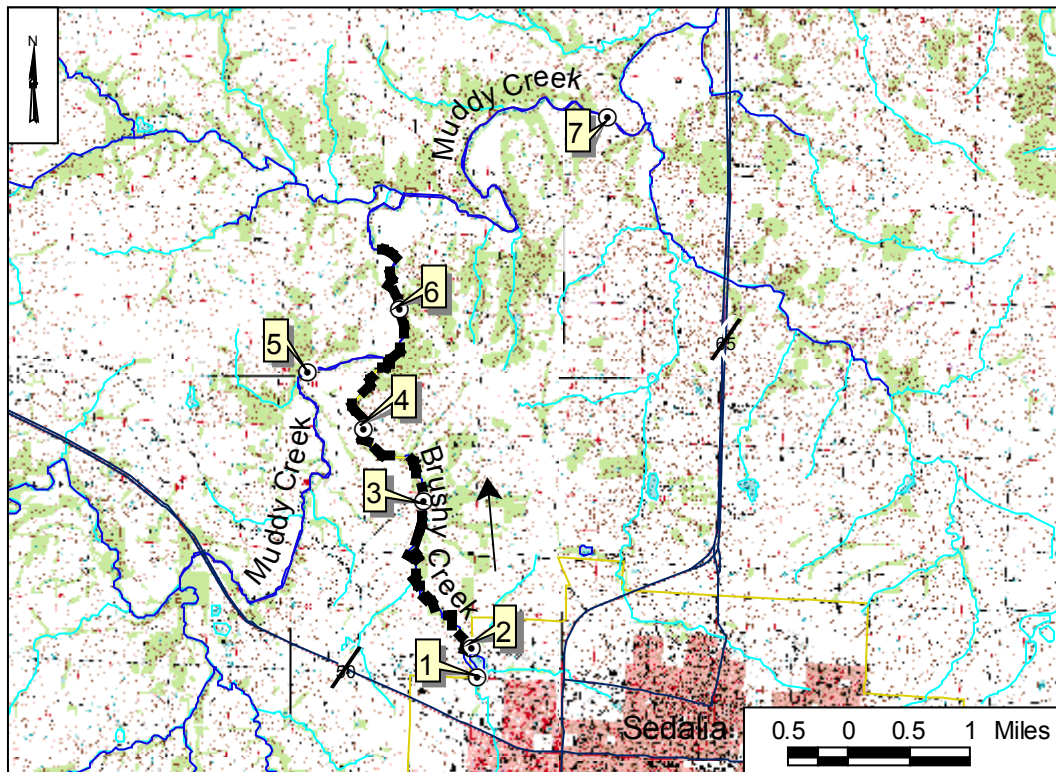
Any waterbody that was listed for Non-Filterable Residue (NFR) in 1998 is now being listed as Volatile Suspended Solids (VSS). The new listing gives a clearer picture of the specific sources contributing to the impairment. VSS are organic solids coming from wastewater treatment plants. The term “NFR” will, however, be retained in the approved TMDL document.

Ammonia ( $\text{NH}_3\text{-N}$ ) is a common by-product of wastewater treatment and under certain conditions can be toxic to aquatic life. On September 3, 1992 there was a fish kill in 2.5 miles of Brushy Creek and one mile of Muddy Creek due to high levels of ammonia from Sedalia Central Wastewater Treatment Plant (WWTP). There was another fish kill on July 14, 1994, due to toxic concentrations of ammonia. Also, wastewater that is high in Biochemical Oxygen Demand (BOD) lowers the dissolved oxygen in a stream. Many aquatic organisms require high levels of oxygen to survive. Low levels of oxygen have been documented frequently in both creeks. VSS refer to particles that are suspended in water, like algae, or those that settle out, like the sewage sludge in Brushy Creek. When these solids settle onto the streambed, they smother natural substrates (stream bottom), aquatic invertebrate animals, and fish eggs. Conditions in these streams have not been protective of aquatic life.

Stream surveys were conducted on Muddy and Brushy creeks during August 24-26, 1993, and again in August 29-31, 1995, as part of a wasteload allocation study. The purpose of the surveys was to quantify pollutant loading from the Sedalia Central WWTP during minimal summer flows. Additional monitoring was done in 1996, 1997 and 1998. As a result, the Sedalia Central WWTP upgraded their facilities to meet more stringent treatment requirements in 1998-2000. More data was collected in 2000 and 2001 to evaluate the effectiveness of improvements at the wastewater treatment plant. In 2001, the impaired portions met water quality standards. A map of the area and three graphs summarizing the existing data may be found below.

The U.S. Environmental Protection Agency approved the TMDL for Muddy Creek and Brushy Creek on February 11, 2002. The TMDL establishes an instream target of 35 mg/L for NFR based on Discharge Monitoring Report data. It also requires a vigorous monitoring plan that was included in Sedalia’s permit when it was renewed in June 2002. These creeks are being proposed for delisting. If future monitoring would show that water quality standards are not being met, the TMDL will be reopened and adjusted as needed.

## Muddy and Brushy Creeks in Pettis County, Missouri, with Sampling Sites

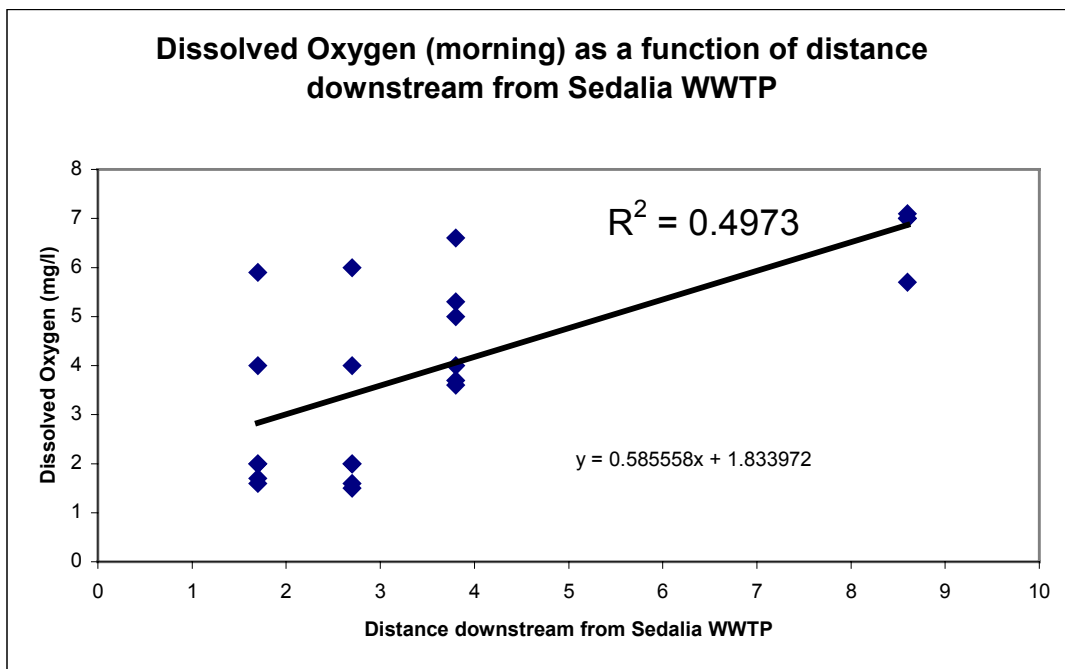


— — — Impaired Segment

← Direction of Flow

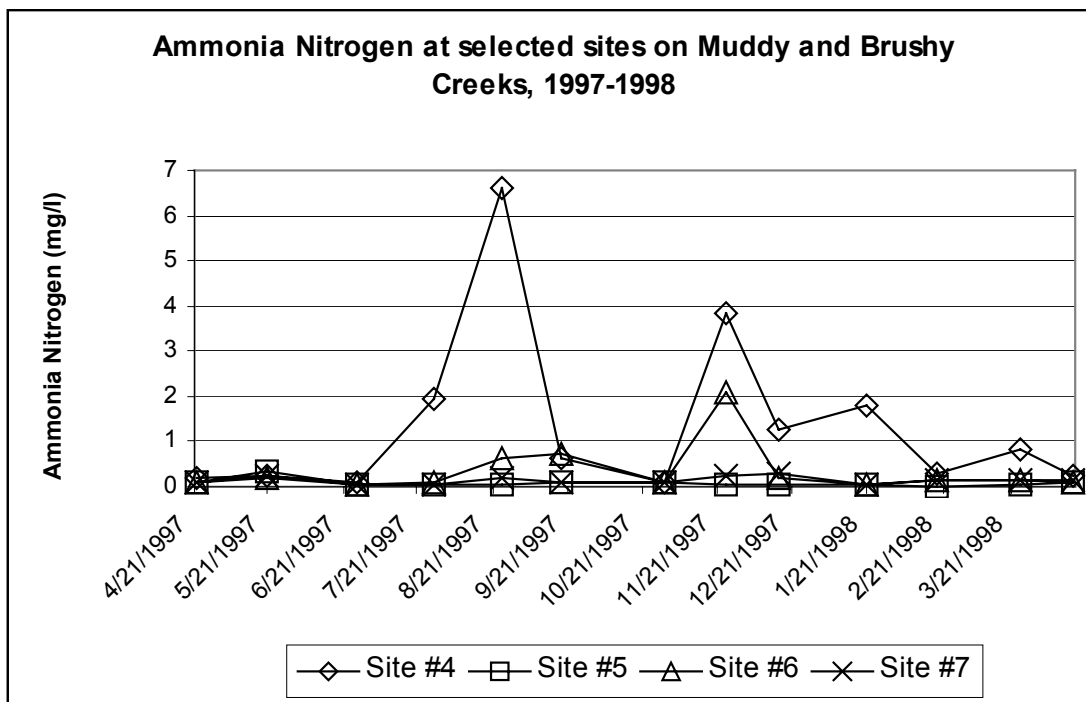
### Site Index

- 1 – Brushy Creek 0.25 mile upstream of Sedalia Central WWTP
- 2 – Sedalia Central WWTP effluent
- 3 – Brushy Creek 1.7 miles downstream of Sedalia Central WWTP
- 4 – Brushy Creek at Cloney Road
- 5 – Muddy Creek at Yeater Road
- 6 – Muddy Creek at Treasure Road
- 7 – Muddy Creek at McCurdy Road

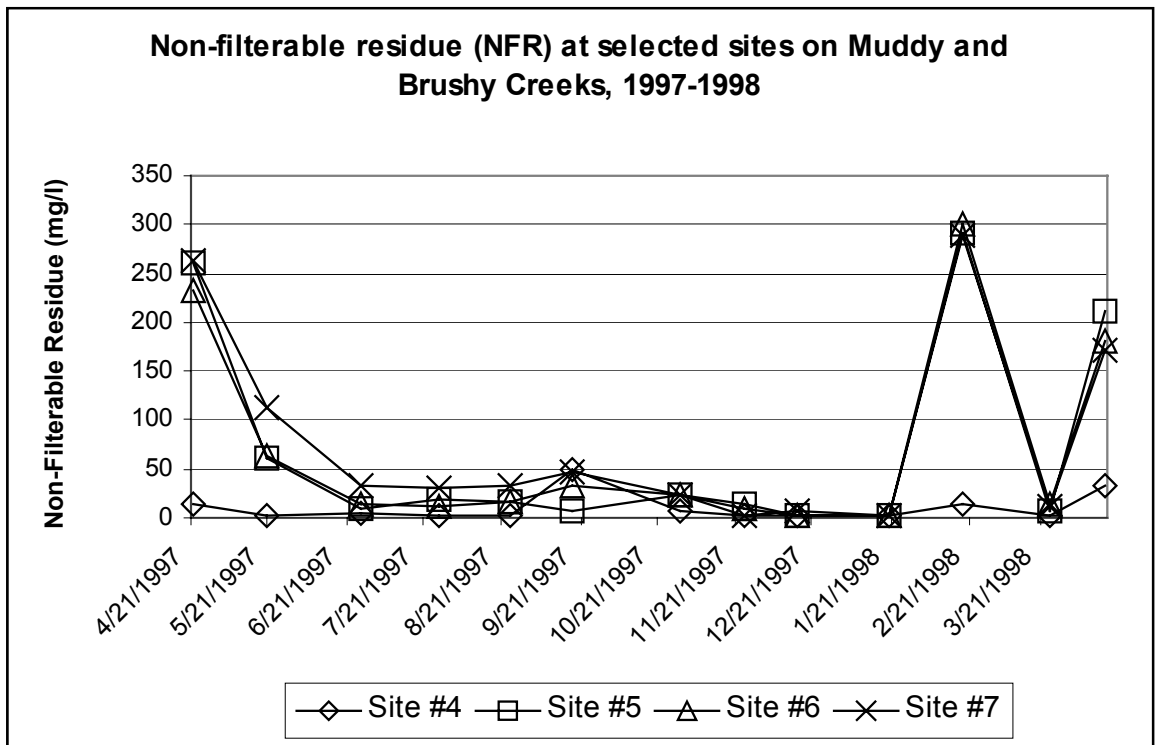


Source: Missouri Department of Natural Resources

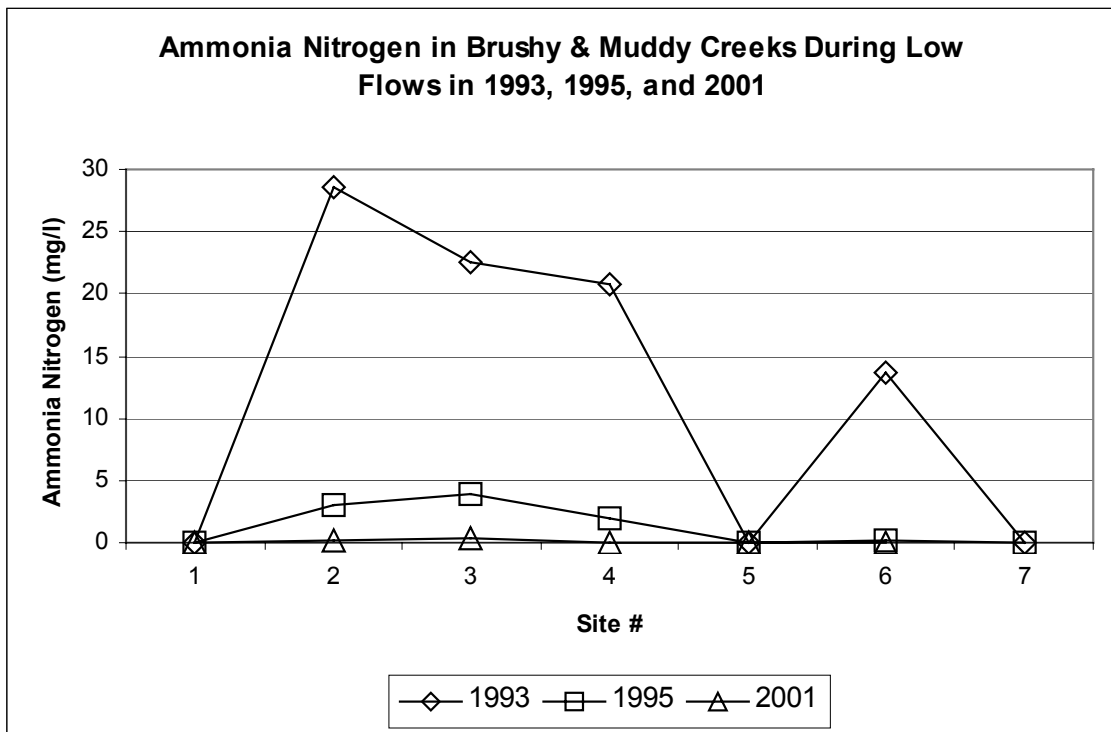
This graph is based on samples taken in during morning hours at times of low flow in 1993, 1995, 2000, and 2001.



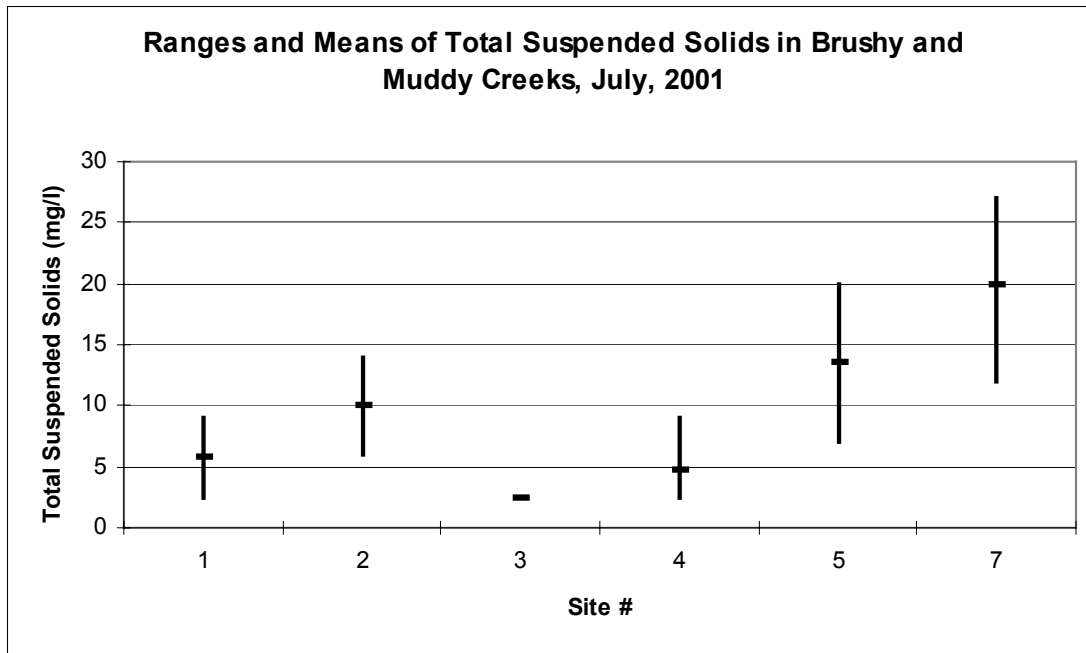
Current NPDES permit ammonia limits: 2.5 mg/L from May 1-Oct 31 and 3.5 mg/L from Nov 1-April 30. Note: Permit limits are higher than the instream water quality standards.



Source: Missouri Department of Natural Resources



Source: Missouri Department of Natural Resources.



Source: Missouri Department of Natural Resources.

**For more information call or write:**

Missouri Department of Natural Resources

Water Pollution Control Program

P.O. Box 176, Jefferson City, MO 65102-0176

1-800-361-4827 or (573) 751-1300 office

(573) 751-9396 fax

Program Home Page: <http://www.dnr.state.mo.us/wpscd/wpcp/index.html>